

Substation system simulation models for transformer risk assessment analysis.

ABSTRACT

This paper comprises a study which is carried out to investigate and evaluate the effect of lightning stresses on the 132 kV substation in the way to improve its reliability in the event of active lightning activities. The paper also detailed the modelling parameters of substation for this transient analysis in order to evaluate the performance and to recommend such configuration to optimize its design to be not only to withstand the stresses but to be more cost effective. The modelling and simulation are carried out using one of the most powerful power system simulations tools that is PSCAD-EMTDC and the substation layout design is adapted from 132/11 kV Simpang Renggam -- Ayer Hitam substation, courtesy of TNB. The model is based on single phase line model as it was suggested by the IEEE to be adequate to represent the substation in transient analysis simulation. The outcome of this paper would be the results of lightning stresses in term of voltage level measured at particular points in substation. The results are then compared with the suggested BIL for assessment of transformer failure.

Keyword: Basic insulation lightning level; Insulation coordination; Lightning; PSCAD/EMTDC.